
PART III.

THE FORESTS OF THE UNITED STATES
IN THEIR
ECONOMIC ASPECTS.

THE FORESTS OF THE UNITED STATES IN THEIR ECONOMIC ASPECTS.

GENERAL REMARKS.

The maps of relative average forest density joined to this report are intended to illustrate the present productive capacity of the forest covering of the country (map No. 16, portfolio). They are based, except in the case of the extreme western states and territories, upon the returns of enumerators. In states originally wooded all land not accounted for in the returns as cleared or treeless, or otherwise known to be destitute of tree covering, is treated as forest. The county is taken as the unit, and is seldom divided, unless varied topography or different natural features in different parts makes further subdivision desirable. In the western states and territories, where topography determines forest distribution, county lines are disregarded, and the estimates are based upon special reports of census experts, or upon the published reports of the various government surveys, maps, etc. The condition and productive capacity of the forest covering have been carefully investigated at many points in each county or unit region, and the area covered with forest, obtained in the manner described above, is multiplied by the average stand of timber or other useful wood. The results thus obtained are necessarily greatly generalized to conform to the scale of the maps used.

The following statement represents the value of the forest crop of the United States for the census year, so far as it has been possible to obtain it:

Saw logs	\$139,836,869	Charcoal used as fuel—		Wood used in the manufacture of—	
Wood used for domestic purposes as fuel (estimated)	306,950,040	In manufacture of iron	\$4,726,114	Handles	\$297,170
Wood used by railroads as fuel	5,126,714	In manufacture of precious metals ..	29,306	Wheel stock	1,364,892
Wood used by steamboats as fuel	1,812,083	In the twenty largest cities	521,316	Wood pulp	1,574,674
Wood used as fuel—		Naval stores	5,000,000	Baskets	314,125
In the manufacture of brick and tile ..	3,978,331	Southern moss	500,000	Excelsior	150,800
In the manufacture of wool	425,230	Railroad ties (29,554,694)	9,806,247	Oars	81,000
In the manufacture of salt	121,081	Fence posts (for fencing railroads) ..	180,000	Shoe pegs	72,000
In the production of precious metals ..	2,874,593	Uncultivated vegetable substances used in the manufacture of medicines	587,000	Hand-made shingles	47,952
In other mining operations	673,602	Uncultivated nuts	78,540		
		Hoop-poles	1,947,316	Total	490,073,094

These returns are incomplete and often unsatisfactory. Many important items are omitted entirely. It was found impossible to obtain statistics of the amount and value of the wood (posts, split rails, etc.) used in fencing, with the exception of posts used by railroads. The amount of material thus consumed annually must be very large, probably exceeding \$100,000,000 in value. No returns of the amount and value of the bark of different trees used in tanning leather have been received, and there are no statistics of the amount and value of the unsaved timber produced—spars, piles, telegraph and other poles, hewed timber, hard wood exported in the log, ships' knees, etc.—that is, all timber not manufactured in saw-mills into lumber. The value of the timber of this sort cut in the United States every year must be very large. The returns include the railway ties laid down by completed roads, and do not embrace those used in the construction of some 10,000 miles of new road built during the census year. It was found impossible to obtain even an estimate of the amount and value of the cooperage stock produced outside of regular saw-mills, and the returns of hand-made shingles only include those made from cypress at a few points in the south Atlantic region. Maple sugar to the amount of 36,576,061 pounds and 1,796,048 gallons of molasses were produced in the forests of the United States during the year 1879. No statistics of the value of these products have, however, been received. Statistics of the value of material consumed in the manufacture of excelsior, wood pulp, wheel stock, handles, shoe pegs, baskets, oars, and hoop-poles are incomplete, and do not fully represent the value of the wood used. The statistics of the value of wild nuts and wild vegetable substances collected are very incomplete, and it has been found impossible to separate the value of the imported from that of the native wood used in the manufacture of veneers, an industry consuming a large amount of high-priced hard wood. Could complete returns of the forest crop of the census year have been obtained it is not improbable that it would be found to exceed \$700,000,000 in value.

THE LUMBER INDUSTRY.

The following table represents the volume, by states and territories, of the lumber industry of the United States for the census year, as derived from the returns of the enumerators on the schedule of manufactures, and from the reports of special agents for manufactures in cities having at the time of the Ninth Census 8,000 or more inhabitants. No distinction between the different kinds of wood sawed was attempted in the enumeration:

THE FORESTS OF THE UNITED STATES.

STATISTICS OF THE LUMBERING INDUSTRY OF THE

	States and Territories.	Number of establishments.	Capital.	AVERAGE NUMBER OF HANDS EMPLOYED.				LABOR.	MATERIALS.	
				Maximum at any one time in the year.	Males above 16 years.	Females above 16 years.	Children and youth.	Wages paid during the year.	Value of logs.	Value of mill supplies.
	The United States	25,708	Dollars. 181,186,122	.....	141,564	425	5,967	Dollars. 31,845,974	Dollars. 139,836,869	Dollars. 6,318,510
1	Alabama	354	1,545,655	2,798	1,611	.....	36	424,156	1,517,986	90,040
2	Alaska .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	Arizona	13	102,450	126	77	.....	2	33,375	126,486	5,300
4	Arkansas	310	1,067,840	2,985	1,690	.....	54	237,394	1,009,954	60,441
5	California	251	6,454,718	4,945	3,423	.....	11	1,095,736	2,055,635	186,868
6	Colorado	96	431,200	1,605	870	.....	7	112,931	654,500	45,794
7	Connecticut	300	657,800	1,262	690	.....	3	178,336	609,024	32,545
8	Dakota	39	113,750	451	286	.....	4	54,974	269,235	12,640
9	Delaware	86	259,250	646	378	.....	18	40,694	229,763	13,013
10	District of Columbia	1	25,000	35	25	.....	.....	6,000	32,000	2,000
11	Florida	135	2,210,550	3,240	1,945	.....	85	562,249	1,763,617	103,590
12	Georgia	655	3,101,452	4,971	3,293	.....	94	554,085	3,049,435	147,720
13	Idaho	48	192,460	311	160	.....	4	33,307	213,691	16,875
14	Illinois	640	3,295,483	5,799	3,652	.....	199	787,867	2,959,537	185,308
15	Indiana	2,022	7,048,088	16,252	9,026	.....	413	1,571,740	9,290,428	336,669
16	Indian territory .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
17	Iowa	328	4,946,390	4,165	2,526	.....	463	325,244	4,023,661	118,224
18	Kansas	146	262,975	831	507	.....	9	60,757	421,738	25,711
19	Kentucky	670	2,200,558	5,140	2,506	1	94	671,030	2,238,888	171,855
20	Louisiana	175	903,950	1,514	943	.....	33	200,063	1,106,280	80,770
21	Maine	848	6,339,396	9,236	6,480	.....	188	1,161,142	4,754,612	197,344
22	Maryland	360	1,237,694	1,769	1,216	.....	23	223,786	1,041,836	64,959
23	Massachusetts	606	2,480,340	3,130	1,940	.....	30	431,612	1,827,497	76,608
24	Michigan	1,649	39,260,422	30,886	22,732	143	1,360	6,967,905	30,819,003	1,432,360
25	Minnesota	234	6,771,145	3,772	2,732	22	100	924,473	4,408,463	120,587
26	Mississippi	205	922,595	2,113	1,123	.....	47	197,867	1,190,902	28,214
27	Missouri	881	2,867,970	6,678	3,408	.....	95	669,644	3,113,049	102,243
28	Montana	86	203,200	374	142	.....	.....	47,945	257,320	20,778
29	Nebraska	38	93,375	295	136	.....	4	20,313	159,823	11,055
30	Nevada	9	132,000	66	35	.....	.....	9,892	151,780	11,020
31	New Hampshire	680	3,745,790	4,765	3,056	.....	48	548,556	2,159,461	113,530
32	New Jersey	284	1,657,305	1,066	760	.....	8	179,693	942,752	47,227
33	New Mexico	26	74,675	282	172	.....	.....	24,240	100,145	16,910
34	New York	2,822	12,230,934	17,509	11,050	.....	389	2,162,972	8,623,874	490,369
35	North Carolina	776	1,743,217	5,334	2,988	.....	91	447,431	1,490,616	86,523
36	Ohio	2,352	7,944,412	15,277	8,769	.....	548	1,708,300	8,603,127	292,979
37	Oregon	228	1,577,875	1,185	566	.....	13	242,154	1,294,703	86,639
38	Pennsylvania	2,827	21,418,588	21,160	14,443	8	463	2,918,459	13,378,580	576,841
39	Rhode Island	49	144,250	200	139	.....	18	33,143	116,085	4,803
40	South Carolina	420	1,056,265	2,338	1,431	.....	37	221,963	1,170,088	67,273
41	Tennessee	755	2,004,503	5,587	3,577	.....	141	549,222	2,006,124	136,761
42	Texas	324	1,660,952	4,579	3,136	1	49	732,914	1,909,704	136,931
43	Utah	107	272,750	845	375	.....	10	65,175	216,619	21,655
44	Vermont	688	3,274,250	4,501	2,411	.....	100	426,953	1,939,775	82,093
45	Virginia	907	2,122,925	5,812	3,922	.....	89	540,231	1,864,283	119,480
46	Washington	37	2,456,450	891	495	.....	4	200,539	1,174,005	14,070
47	West Virginia	472	1,038,020	3,765	2,057	.....	126	459,045	1,307,843	67,529
48	Wisconsin	704	19,824,059	14,079	7,748	250	467	2,257,218	12,219,097	252,370
49	Wyoming	7	26,700	68	38	6,360	24,725	2,625

THE FORESTS OF THE UNITED STATES.

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UNITED STATES FOR THE YEAR ENDING MAY 31, 1880.

PRODUCTS.								
Lumber (board measure).	Laths.	Shingles.	Staves.	Sets of headings.	Spool and bobbin stock (board measure).	Value of all other products.	Total value of all products.	Rank according to value of products.
Feet.	Number.	Number.	Number.	Number.	Feet.	Dollars.	Dollars.	
18,091,350,000	1,701,788,000	5,555,040,000	1,248,226,000	140,523,000	34,076,000	2,682,668	233,268,729	
251,851,000	14,147,000	5,427,000	2,857,000	437,000			2,640,634	23
10,715,000	150,000	1,760,000	300,000			1,010	215,918	44
172,503,000	6,527,000	61,758,000	1,640,000	350,000			1,793,848	29
304,795,000	2,420,000	138,718,000	2,063,000	1,203,000		3,000	4,428,950	13
63,792,000	4,925,000	27,214,000				700	1,051,295	34
64,427,000	1,719,000	7,192,000	270,000	12,000	83,000	12,930	1,076,455	33
29,280,000	564,000	4,823,000				500	435,792	37
31,572,000	317,000	506,000	4,510,000	550,000			411,060	38
4,000,000	1,000,000					2,000	50,000	46
a 247,627,000	20,101,000	3,061,000	791,000	110,000		13,990	3,060,291	21
451,788,000	17,438,000	25,332,000	2,014,000	964,000	4,000	3,975	4,875,310	12
18,204,000	750,000	4,235,000				60,200	340,635	40
b 334,244,000	b 25,077,000	b 15,300,000	24,443,000	1,385,000	30,000	16,807	5,063,037	11
915,943,000	28,031,000	26,634,000	283,071,000	26,389,000	1,957,000	145,750	14,260,830	5
c 412,578,000	c 70,924,000	c 128,100,000	5,335,000	650,000		38,343	6,185,628	0
45,281,000	25,000	885,000			150,000	3,400	682,697	35
305,684,000	20,850,000	25,253,000	23,148,000	8,174,000	383,000	75,655	4,064,361	14
133,472,000	7,745,000	80,185,000	220,000	33,000		15,470	1,764,640	20
560,656,000	184,820,000	426,530,000	62,376,000	3,312,000	13,426,000	182,618	7,933,868	7
123,336,000	7,955,000	4,429,000	16,227,000			149,894	1,813,332	28
d 205,244,000	d 16,947,000	d 19,607,000	21,062,000	1,880,000	572,000	44,895	3,120,184	20
4,172,572,000	461,805,000	2,584,717,000	199,821,000	21,897,000	6,038,000	531,406	52,449,928	1
563,974,000	88,088,000	104,568,000	7,825,000	547,000		21,100	7,366,038	8
168,747,000	7,908,000	5,355,000	00,000			5,349	1,920,335	27
e 899,744,000	e 20,880,000	e 8,882,000	21,426,000	3,363,000		7,097	5,265,617	10
21,420,000	2,620,000	9,627,000				1,900	527,695	36
13,585,000						1,100	265,062	41
21,545,000		485,000					243,200	42
292,267,000	49,454,000	67,086,000	31,354,000	3,491,000	3,072,000	58,612	3,842,612	15
109,679,000	8,948,000	10,717,000	40,000	155,000	883,000	40,385	1,627,640	32
11,195,000	107,000	722,000	20,000				173,930	45
1,184,220,000	79,399,000	305,711,000	62,654,000	22,136,000	1,003,000	285,263	14,356,910	4
241,822,000	13,340,000	8,707,000	45,000	571,000	1,253,000	7,195	2,672,790	22
910,832,000	50,625,000	24,876,000	214,245,000	25,779,000	25,000	196,788	13,864,460	6
177,171,000	18,245,000	5,040,000				10,500	2,030,463	26
1,788,844,000	183,740,000	288,561,000	80,062,000	10,401,000	326,000	383,044	22,457,350	2
8,469,000	10,000	1,986,000	365,000		3,700,000	174	240,570	43
185,772,000	23,133,000	10,086,000	385,000	93,000		41,700	2,001,507	25
302,673,000	21,275,000	14,205,000	4,342,000	570,000	6,000	72,998	3,744,905	16
328,968,000	14,131,000	112,523,000		140,000		10,350	3,673,449	17
25,709,000	1,563,000	9,293,000				1,785	375,164	39
322,942,000	19,745,000	55,711,000	13,219,000	1,572,000	415,000	2,575	3,258,816	10
315,939,000	14,402,000	8,223,000	14,333,000	929,000	800,000	30,355	3,434,160	18
160,176,000	6,550,000	3,610,000	23,660,000				1,734,742	31
180,112,000	12,071,000	3,695,000	41,992,000	1,952,000		40,193	2,431,857	24
1,542,021,000	215,132,000	862,922,000	82,545,000	7,498,000		152,171	17,052,347	3
2,060,000	300,000	865,000					40,996	47

a Including 77,500,000 feet manufactured from logs cut in Alabama.

b Including 73,700,000 feet lumber, 15,941,000 laths, and 11,226,000 shingles, manufactured from logs cut in Wisconsin.

c Including 534,199,600 feet lumber, 78,728,000 laths, and 127,591,000 shingles, manufactured from logs cut in Wisconsin.

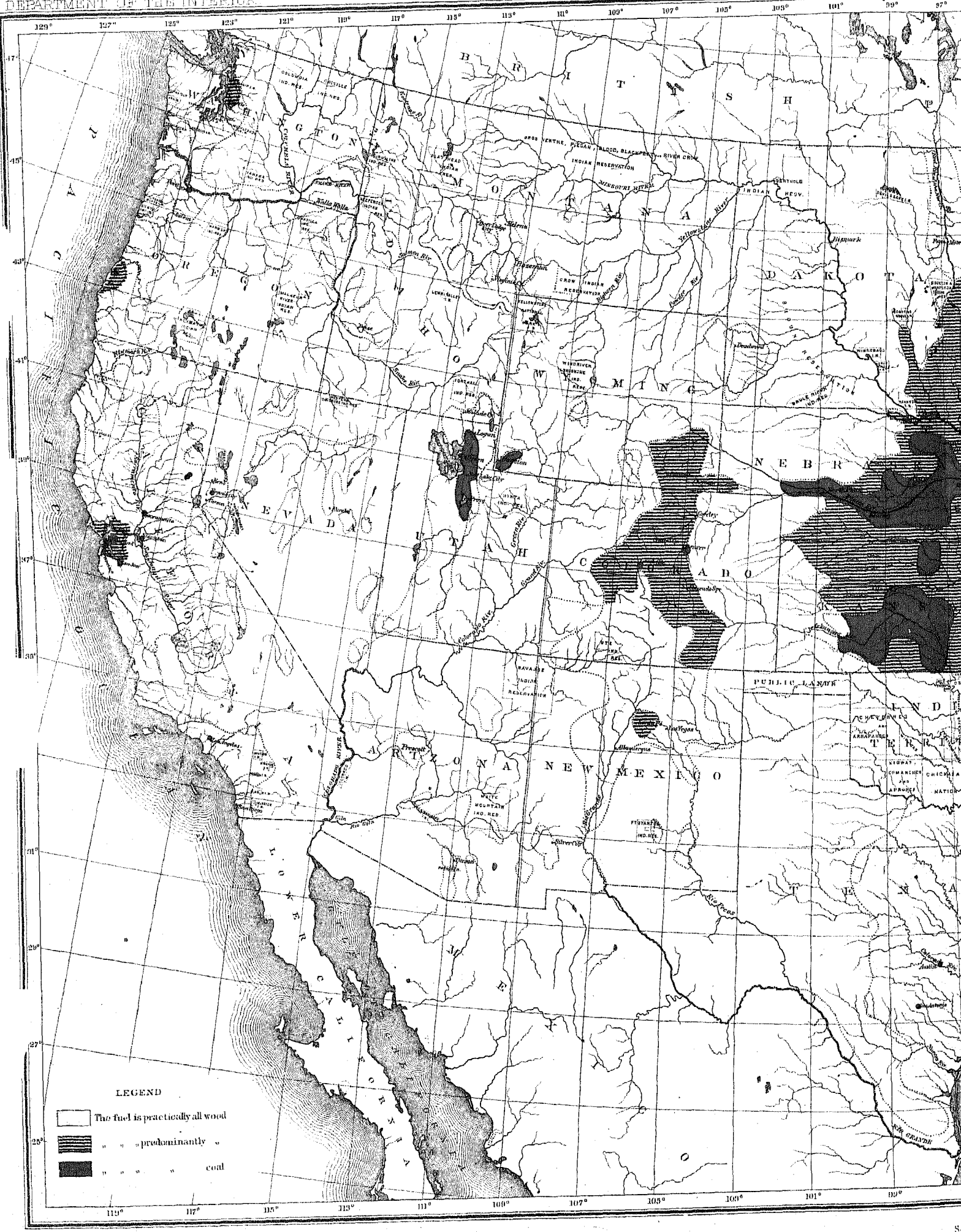
d Including 26,000,000 feet lumber, 11,962,000 laths, and 860,000 shingles, manufactured from logs cut in New Hampshire and Vermont.

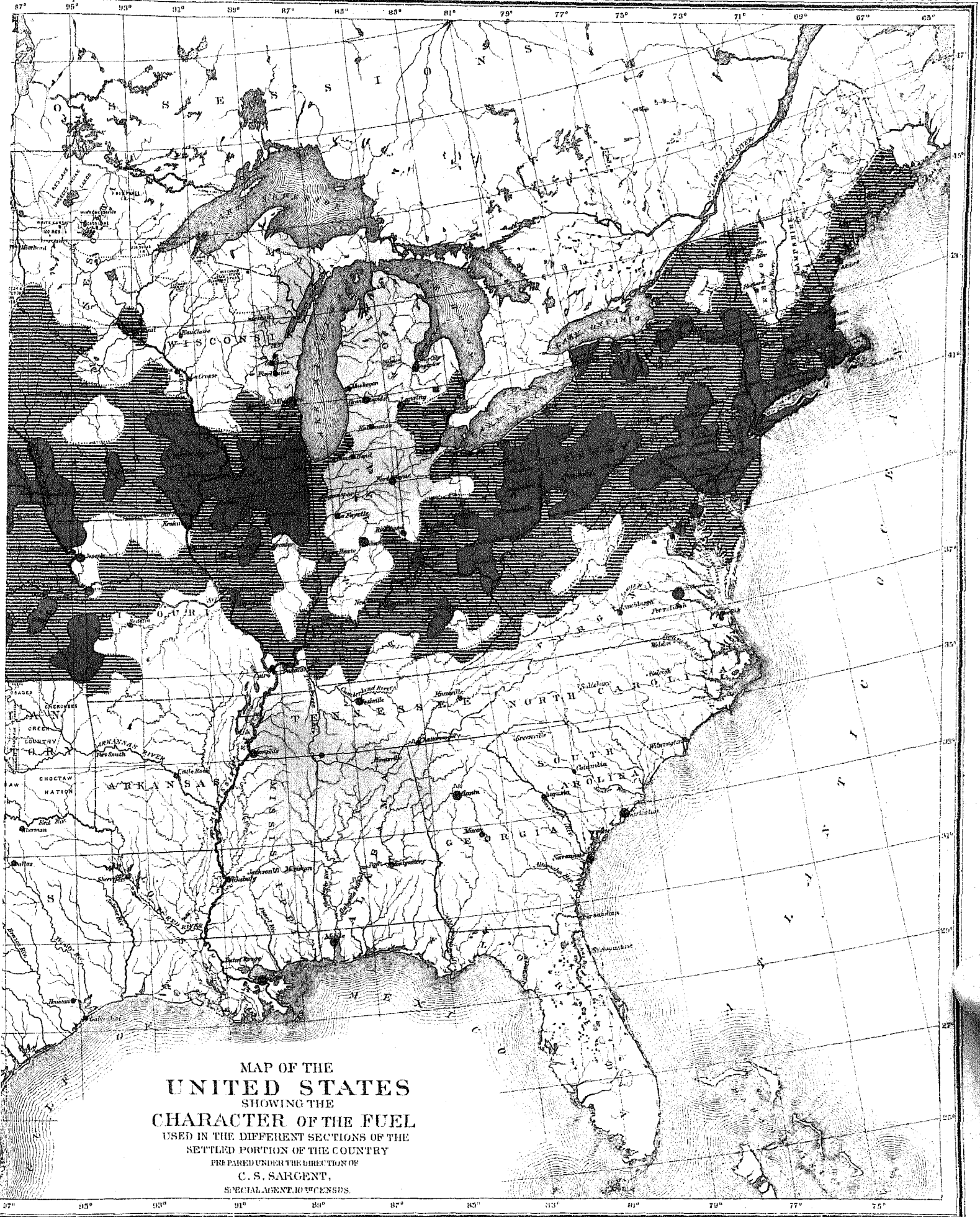
e Including 27,000,000 feet lumber, 12,400,000 laths, and 5,300,000 shingles, manufactured from logs cut in Wisconsin.

In the following table the average importance of the saw-mills located in the different states and territories is shown:

AVERAGE SIZE AND PRODUCT OF SAW-MILLS IN EACH STATE AND TERRITORY OF THE UNITED STATES.

States and Territories.	Total number of establishments.	Capital.	NUMBER OF HANDS EMPLOYED.		MATERIALS AND LABOR.			PRODUCTS.							
			Maximum at any one time in the year.	Average.	Value of logs.	Value of mill supplies.	Wages paid during the year.	Lumber (board measure).	Laths.	Shingles.	Staves.	Sets of head-logs.	Spool and bobbin stock.	Value of other products.	Total value of all products.
		Dolla.			Dolla.	Dolla.	Dolla.	Feet.	No.	No.	No.	No.	Feet.	Dolla.	Dolla.
The United States..	25,708	7,048	8.8	5.8	5,436	240	1,235	703,000	68,000	216,000	48,000	5,700	1,300	104	9,678
Alabama.....	354	4,366	7.0	4.0	4,288	256	1,198	712,000	40,000	15,000	6,000	1,000			7,485
Alaska.....															
Arizona.....	13	7,980	0.7	6.0	0,720	408	2,567	824,000	11,000	130,000	23,000			77	10,600
Arkansas.....	310	3,347	0.0	5.5	3,166	100	744	541,000	20,000	104,000	5,000	1,000			5,623
California.....	251	25,710	10.7	13.7	8,100	744	4,305	1,214,000	10,000	553,000	8,000	5,000		12	17,645
Colorado.....	60	5,013	10.0	0.0	0,808	470	1,170	604,000	51,000	283,000				7	10,951
Connecticut.....	300	2,110	4.0	2.0	2,030	108	594	215,000	6,000	24,000	1,000			43	350
Dakota.....	30	2,017	11.6	7.5	0,003	324	1,410	751,000	15,000	124,000				13	11,174
Delaware.....	86	3,015	7.5	4.5	2,672	158	473	367,000	4,000	6,000	52,000	6,000			4,780
District of Columbia.....	1	25,000	35.0	25.0	32,000	2,000	6,000	4,000,000	1,000,000					2,000	50,000
Florida.....	135	10,441	24.0	15.0	13,064	708	4,165	1,834,000	150,000	23,000	6,000	1,000		104	22,608
Georgia.....	655	4,735	7.5	5.0	4,055	225	845	600,000	27,000	39,000	3,000	1,000		6	7,443
Idaho.....	48	4,000	0.5	3.6	4,462	352	700	380,000	10,000	88,000				1,234	0,340
Illinois.....	640	5,140	0.0	0.0	4,024	200	1,230	522,000	40,000	24,000	38,000	2,000		26	7,911
Indiana.....	2,022	3,485	8.0	5.0	4,600	180	777	453,000	14,000	13,000	140,000	13,000		72	7,052
Indian territory.....															
Iowa.....	328	15,080	12.0	0.0	12,267	360	2,513	1,258,000	244,000	300,000	16,000	2,000		117	10,000
Kansas.....	146	1,801	5.7	3.5	2,888	170	457	310,000	40,000	6,000				23	4,700
Kentucky.....	670	3,418	7.7	3.8	3,341	256	1,003	450,000	40,000	37,000	34,000	12,000		113	6,000
Louisiana.....	175	5,105	8.0	5.0	0,321	402	1,143	762,000	44,000	170,000	1,000			68	10,053
Maine.....	848	7,475	11.0	7.8	5,607	232	1,300	608,000	218,000	503,000	73,000	4,000		215	9,353
Maryland.....	300	3,354	4.8	3.0	2,823	170	600	334,000	21,000	42,000	44,000			400	4,914
Massachusetts.....	606	4,093	5.0	3.0	3,015	120	712	308,000	28,000	32,000	35,000	3,000		53	5,140
Michigan.....	1,640	20,808	18.7	14.7	18,700	808	4,225	2,530,000	280,000	1,508,000	121,000	10,000		322	31,807
Minnesota.....	234	28,930	10.0	12.0	18,830	515	3,050	2,410,000	370,000	811,000	33,000	2,000		90	31,478
Mississippi.....	295	3,127	7.0	4.0	4,037	95	671	572,000	27,000	18,000				18	6,540
Missouri.....	891	3,253	7.0	4.0	3,531	116	760	453,000	23,000	10,000	24,000	4,000		8	6,900
Montana.....	16	5,783	11.0	4.0	7,148	577	1,332	505,000	70,000	267,000				51	14,676
Nebraska.....	36	2,457	9.0	3.7	4,048	200	771	357,000						20	6,975
Nevada.....	0	14,000	7.0	4.0	10,805	1,224	1,000	2,304,000		50,000					27,022
New Hampshire.....	680	5,508	7.0	4.5	3,175	107	800	420,000	73,000	98,000	40,000	5,000		80	5,050
New Jersey.....	284	5,830	3.7	2.7	3,310	100	633	380,000	31,000	38,000				142	5,731
New Mexico.....	20	2,870	10.8	6.7	3,851	650	932	430,000	4,000	27,000					6,090
New York.....	2,822	4,688	6.0	4.0	3,057	173	700	419,000	28,000	108,000	22,000	8,000		101	5,087
North Carolina.....	770	2,240	7.0	4.0	1,021	111	576	311,000	17,000	11,000				0	3,445
Ohio.....	2,052	3,378	6.5	4.0	3,058	124	726	387,000	21,000	10,000	61,000	11,000		83	5,805
Oregon.....	238	0,020	5.0	2.5	5,678	100	1,002	777,000	80,000	2,000				46	8,905
Pennsylvania.....	2,827	7,570	7.5	5.0	4,732	204	1,032	613,000	65,000	102,000	28,000	3,000		130	7,944
Rhode Island.....	40	2,044	5.0	3.0	2,060	08	676	172,000		40,000	7,000			8	4,000
South Carolina.....	420	2,515	5.5	3.5	2,785	160	528	442,000	55,000	24,000				00	4,837
Tennessee.....	755	2,055	7.0	5.0	2,057	181	727	400,000	28,000	18,000	5,000			00	4,000
Texas.....	324	5,126	14.0	0.8	5,804	577	2,262	1,015,000	43,000	347,000				32	11,338
Utah.....	167	2,540	7.0	3.5	2,024	202	600	240,000	14,000	87,000				10	3,500
Vermont.....	608	4,750	6.5	3.0	2,819	110	620	460,000	28,000	80,000	10,000	2,000		8	4,750
Virginia.....	907	2,340	6.0	4.0	2,055	131	595	348,000	10,000	9,000	15,000	1,000		33	3,790
Washington.....	37	60,300	24.0	13.5	31,730	380	5,420	4,320,000	177,000	97,000	630,000			40,885	
West Virginia.....	472	3,535	8.0	4.0	2,770	143	974	381,000	25,000	8,000	80,000	4,000		85	5,152
Wisconsin.....	704	28,150	20.0	12.0	17,350	358	3,206	2,100,000	305,000	1,220,000	117,000	10,000		210	25,600
Wyoming.....	7	3,814	0.7	5.5	3,532	375	911	420,000	40,000	123,000					5,855





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Michigan is the greatest lumber-producing state in the Union. The value of its lumber product, with that of Wisconsin and Minnesota, exceeds one-third of the total value of all the lumber manufactured in the United States. This enormous development of the lumber business in the lake region is due to the excellence of its forests, the natural advantages of the country for manufacturing lumber, and the easy communication between these forests and the treeless agricultural region west of the Mississippi river.

The extinction of the forests of the lake region may be expected to seriously affect the growth of population in the central portion of the continent. The country between the Mississippi river and the Rocky mountains, now largely supplied with lumber from Michigan, Wisconsin, and Minnesota, must for building material soon depend upon the more remote pine forests of the Gulf region or those of the Pacific coast. A great development in the now comparatively unimportant lumber-manufacturing interests in these regions may therefore be expected. New centers of distribution must soon supplant Chicago as a lumber market, and new transportation routes take the place of those built to move the pine grown upon the shores of the great lakes. It is not probable, however, that any one point will ever attain the importance now possessed by Chicago as a center for lumber distribution. With the growth of the railroad system and the absence of good water communication from the great forests remaining in the country toward the center of the continent, lumber will be more generally shipped direct by rail from the mills to the consumer than in the past. In this way the pine of Mississippi, Louisiana, and Arkansas will reach Kansas, Nebraska, and the whole country now tributary to Chicago. Western Texas and northern Mexico will be supplied by rail with the pine of eastern Texas, and the prairies of Minnesota and Dakota must draw their lumber by rail, not as at present from the pine forests covering the shores of lake Superior, but from the fir and redwood forests of the Pacific coast.

FUEL.

The following table represents the consumption of forest products as fuel during the census year. The estimates of the amount and value of the wood used for domestic fuel are based upon answers to letters of inquiry addressed to persons living in every town in the United States. The average amount and value of the wood used by a family of five persons, taken as a unit, is multiplied by the number of families in each state using wood for fuel, and the result thus obtained is taken as the total state consumption:

WOOD USED AS FUEL FOR VARIOUS PURPOSES.

Use.	Cords.	Value.	Use.	Cords.	Value.
For domestic purposes as below	140,537,439	\$306,950,040	In the manufacture of brick and tile.....	1,157,522	\$3,978,331
By railroads.....	1,971,813	5,126,714	In the manufacture of salt.....	540,448	121,681
By steamboats.....	787,862	1,812,083	In the manufacture of wool.....	158,208	425,239
In mining and amalgamating the precious metals.....	358,074	2,874,593	Total.....	145,778,137	321,962,733
In other mining operations.....	266,771	673,692			

ESTIMATED CONSUMPTION OF WOOD FOR DOMESTIC PURPOSES.

Number of persons using wood for domestic fuel, 32,375,074.

States and Territories.	Cords.	Value.	States and Territories.	Cords.	Value.	States and Territories.	Cords.	Value.
Alabama.....	6,076,754	\$8,727,377	Kansas.....	2,065,439	\$7,928,723	North Carolina.....	7,434,090	\$9,019,569
Alaska.....			Kentucky.....	7,994,813	13,313,220	Ohio.....	8,191,543	10,492,574
Arizona.....	170,017	724,572	Louisiana.....	1,944,858	4,607,415	Oregon.....	432,254	1,254,511
Arkansas.....	3,922,400	5,095,821	Maine (a).....	1,215,881	4,078,137	Pennsylvania.....	7,361,992	15,607,051
California.....	1,748,092	7,693,731	Maryland.....	1,152,919	3,170,941	Rhode Island.....	154,953	706,011
Colorado.....	426,719	1,638,783	Massachusetts (a).....	890,041	4,613,263	South Carolina.....	3,670,950	11,505,907
Connecticut.....	525,630	2,371,532	Michigan.....	7,838,904	13,197,240	Tennessee.....	8,084,611	10,674,722
Dakota.....	422,948	3,028,300	Minnesota.....	1,669,508	5,873,421	Texas.....	4,883,862	10,177,311
Delaware.....	177,806	751,311	Mississippi.....	5,000,758	7,145,116	Utah.....	171,923	418,280
District of Columbia.....	26,902	80,706	Missouri.....	4,016,373	8,633,465	Vermont.....	782,388	2,509,189
Florida.....	609,046	1,230,412	Montana.....	119,947	400,638	Virginia.....	5,416,112	10,404,184
Georgia.....	5,910,045	8,270,245	Nebraska.....	908,188	3,859,843	Washington.....	184,226	499,904
Idaho.....	99,910	383,686	Nevada.....	155,276	972,712	West Virginia.....	2,241,069	3,374,701
Illinois.....	5,200,104	14,136,662	New Hampshire.....	507,719	1,964,669	Wisconsin.....	7,206,126	11,863,739
Indiana.....	7,059,874	13,334,729	New Jersey.....	642,588	2,787,216	Wyoming.....	40,213	224,848
Indian territory.....			New Mexico.....	169,946	1,033,360	Total.....	140,537,439	\$306,950,040
Iowa.....	4,090,049	14,611,280	New York.....	11,290,075	37,599,364			

a Including a small amount imported from Canada.

CONSUMPTION OF CHARCOAL.

Domestic and manufacturing purposes.	Bushels.	Value.
In the twenty largest cities.....	4,319,104	\$521,316
In the manufacture of iron.....	69,592,091	4,726,114
In the production of precious metals.....	97,687	29,309
Total.....	74,008,972	5,276,739

The forests of the United States, in spite of the great and increasing drains made upon them, are capable of yielding annually for many years longer a larger amount of material than has yet been drawn from them, even with our present reckless methods of forest management. The great pine forest of the north has already, it is true, suffered fatal inroads. The pine which once covered New England and New York has already disappeared. Pennsylvania is nearly stripped of her pine, which once appeared inexhaustible. The great northwestern pineries are not yet exhausted, and with newly-introduced methods, by which logs once supposed inaccessible are now profitably brought to the mills, they may be expected to increase the volume of their annual product for a few years longer in response to the growing demands of the great agricultural population fast covering the treeless midcontinental plateau. The area of pine forest, however, remaining in the great pine-producing states of Michigan, Wisconsin, and Minnesota is dangerously small in proportion to the country's consumption of white pine lumber, and the entire exhaustion of these forests in a comparatively short time is certain. The wide areas now covered in New England by a vigorous second growth of white pine, although insignificant in extent and productiveness in comparison with the forests it replaces, must not be overlooked in considering the pine supply of the country. These new forests, yielding already between two and three hundred million feet of lumber annually, are capable of great future development.

The pine belt of the south Atlantic region still contains immense quantities of timber unequalled for all purposes of construction, although unsuited to take the place of the white pine of the north. The southern pine forests, although stripped from the banks of streams flowing into the Atlantic, are practically untouched in the Gulf states, especially in those bordering the Mississippi river. These forests contain sufficient material to long supply all possible demands which can be made upon them.

The hard-wood forests of the Mississippi basin are still, in certain regions at least, important, although the best walnut, ash, cherry, and yellow poplar have been largely culled. Two great bodies of hard wood timber, however, remain, upon which comparatively slight inroads have yet been made. The most important of these forests covers the region occupied by the southern Alleghany Mountain system, embracing southwestern Virginia, West Virginia, western North and South Carolina, and eastern Kentucky and Tennessee. Here oak unequalled in quality abounds. Walnut is still not rare, although not found in any very large continuous bodies, and cherry, yellow poplar, and other woods of commercial importance are common. The second great body of hard wood, largely oak, is found west of the Mississippi river, extending from central Missouri to western Louisiana. The forests of Michigan, especially those of the northern peninsula, still abound in considerable bodies of hard wood, principally maple. Throughout the remainder of the Atlantic region the hard-wood forests, although often covering considerable areas, have everywhere lost their best timber, and are either entirely insufficient to supply the local demand of the present population, or must soon become so.

In the Pacific region the great forests of fir which extend along the coast region of Washington territory and Oregon are still practically intact. Fire and the ax have scarcely made a perceptible impression upon this magnificent accumulation of timber. Great forests of pine still cover the California sierras through nearly their entire extent; the redwood forest of the coast, however, once, all things considered, the most important and valuable body of timber in the United States, has already suffered seriously, and many of its best and most accessible trees have been removed. This forest still contains a large amount of timber, although its extent and productive capacity has been generally exaggerated. The demand for redwood, the only real substitute for white pine produced in the forests of the United States, is rapidly increasing, and even at the present rate of consumption the commercial importance of this forest must soon disappear.

The pine forests which cover the western slopes of the northern Rocky mountains and those occupying the high plateau and inaccessible mountain ranges of central Arizona and southwestern New Mexico have not yet suffered serious damage at the hands of man. The remaining forests of the Pacific region, of little beyond local importance, are fast disappearing. The area of these interior forests is diminished every year by fire and by the demands of a careless and indifferent population; and their complete extermination is probably inevitable.

The forest wealth of the country is still undoubtedly enormous. Great as it is, however, it is not inexhaustible, and the forests of the United States, in spite of their extent, variety, and richness, in spite of the fact that the climatic conditions of a large portion of the country are peculiarly favorable to the development of forest growth, cannot always continue productive if the simplest laws of nature governing their growth are totally disregarded.

The judicious cutting of a forest in a climate like that of the Atlantic or Pacific Coast regions entails no serious or permanent loss. A crop ready for the harvest is gathered for the benefit of the community; trees which have reached their prime are cut instead of being allowed to perish naturally, and others take their place. The permanence of the forest in regions better suited for the growth of trees than for general agriculture may thus be insured. Two causes, however, are constantly at work destroying the permanence of the forests of the country and threatening their total extermination as sources of national prosperity—fire and browsing animals inflict greater permanent injury upon the forests of the country than the ax, recklessly and wastefully as it is generally used against them.





FOREST FIRES.

The extent of the loss which the country sustains every year from injury to woodlands by fire is enormous. An attempt was made to obtain, by means of circulars of inquiry addressed to enumerators of the census and other persons living in every town of the United States, some estimate of the actual destruction of forest material in this way. More than 30,000 of these circulars were sent out. The information obtained, often vague and unsatisfactory, after a most critical examination, in which all doubtful or contradictory returns were entirely thrown out, is presented in the following table and accompanying map. It must be borne in mind that estimates based upon information obtained in this manner are liable to very considerable error, and due allowance must therefore be made for inaccurate or incomplete returns. Many towns, and even counties, in which forest fires are known to have occurred during the year 1880, made no returns whatever, and the returns of other counties were excluded. It is therefore fair, perhaps, to assume that the following table, inaccurate and unsatisfactory as it no doubt is in many respects, at least does not exaggerate the annual loss inflicted upon the country by forest fires:

TABLE OF FOREST FIRES OCCURRING DURING THE CENSUS YEAR.

States and Territories.	Areas burned, in acres.	Value of property destroyed.	CAUSES OF FIRE.															
			Improving pas- turing.	Clearing land.	Locomotives.	Hunters.	Camp fires.	Smokers.	Malice.	Prairie fires.	Coal pits.	Lightning.	Indians.	Prospectors.	Travelers.	Spontaneous combustion.	Wood cutters.	Carelessness.
The United States.....	10, 274, 089	\$25, 462, 250	197	1, 152	508	628	72	35	262	12	9	32	56	10	2	2	3	3
Alabama.....	560, 160	121, 225	34	16	4	20	3											
Alaska.....																		
Arizona.....	10, 240	56, 000					3		2				2					
Arkansas.....	858, 115	250, 470		27		20						1						
California.....	356, 815	440, 750		9		23	28		5				4					
Colorado.....	113, 820	935, 500				7	10		1				5	2	2			
Connecticut.....																		
Dakota.....			4		2	2			1									
Delaware.....	3, 305	15, 675		6	6				2									
District of Columbia.....																		
Florida.....	105, 320	69, 800	11	2		2			3									
Georgia.....	705, 351	107, 620	21	15	2	16												
Idaho.....	21, 000	202, 000				3						2	10	6				
Illinois.....	48, 061	45, 775		20		27	12		3									
Indiana.....	90, 427	130, 335		52	20	23			4									
Indian territory.....	1, 000																	
Iowa.....	11, 017	45, 470		26	5	8				7								
Kansas.....	7, 080	14, 700			1		3		1	5								
Kentucky.....	556, 647	237, 635		51	12	33			10									
Louisiana.....	64, 410	6, 800	2	2		2												
Maine.....	35, 230	123, 315		30	14	20			3									
Maryland.....	41, 076	37, 425		31	16	14			5									
Massachusetts.....	13, 899	102, 262		40	52	37		10	8		3							
Michigan.....	238, 271	985, 985		161	48	50		3					1					
Minnesota.....	250, 805	1, 393, 110		40	13	14			9				8					
Mississippi.....	222, 800	78, 505	12	8	1	17			1									
Missouri.....	783, 646	294, 865	27	14	16	29		1	10									
Montana.....	88, 020	1, 128, 000			1	1		1					1	1				
Nebraska.....																		
Nevada.....	8, 710	19, 000				3							3					
New Hampshire.....	5, 954	63, 610		7	12	6		1	1									
New Jersey.....	71, 074	252, 240		7	28	6			7		6							
New Mexico.....	64, 034	142, 075		37	1	2			2				3			2		
New York.....	149, 491	1, 210, 785		37	48	22												
North Carolina.....	546, 102	237, 980		115	11	34	10	4	25			22						
Ohio.....	74, 114	797, 170		94	27	57		3	11									
Oregon.....	132, 320	593, 850		7		12			4				4					
Pennsylvania.....	685, 738	3, 043, 723		120	133	17			102									
Rhode Island.....																		
South Carolina.....	431, 730	291, 223	22	17	1	25						2						

TABLE OF FOREST FIRES OCCURRING DURING THE CENSUS YEAR—Continued.

States and Territories.	Areas burned, in acres.	Value of property destroyed.	CAUSES OF FIRE.															
			Improving pas- torage.	Clearing land.	Locomotives.	Hunters.	Camp fires.	Smokers.	Malice.	Prairie fires.	Coal pits.	Lightning.	Indians.	Prospectors.	Travelers.	Spontaneous combustion.	Wood cutters.	Carelessness.
Tennessee	985,430	\$5,254,980	19	19	6	14	.....	1	14	.....	.....	.....	.....	.....	.....	.....	.....	.....
Texas	590,359	273,990	19	3	.....	7	.....	2	10	.....	.....	4	.....	.....	.....	.....	.....	.....
Utah	42,865	1,042,800	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	4	.....	.....	.....	3	.....
Vermont.....	3,941	48,406	.....	10	5	2	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Virginia	272,319	326,944	.....	26	13	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	37,910	713,200	.....	5	.....	3	.....	.....	2	.....	.....	1	8	.....	.....	.....	.....	.....
West Virginia	476,775	155,280	6	22	7	13	.....	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin	406,298	725,610	20	58	12	15	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wyoming	83,780	3,255,000	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	3	1	.....	.....	.....	.....

The largest number of these fires of any one class was traced to farmers clearing land and allowing their brush fires to escape into the forest. The carelessness of hunters in leaving fires to burn in abandoned camps, next to farmers, was the cause of the greatest injury. The railroads were responsible, too, for serious damage to the forest from fires set by sparks from locomotives, while the intentional burning of herbage in the forest to improve pasturage often caused serious destruction of timber.

Only the value of the material actually destroyed by fire is included in these estimates. The loss of timber by fire, great as it is, is insignificant in comparison with the damage inflicted upon the soil itself, or with the influence of fire upon subsequent forest growth. If a forest is destroyed by fire all trees, old and young, giants ready for the ax, and germinating seedlings—the embryo forests of succeeding centuries—are swept away. Undergrowth essential to protect the early growth of trees, the roots of perennial herbage, and the seeds of all plants are consumed. The fertility, or rather the ability of the burned soil to produce again spontaneously a similar crop of trees to the one destroyed, is lost, and the subsequent recovering of burned land with the species of the original forest is only accomplished, if accomplished at all, through the restoration of fertility following the slow growth and decay of many generations of less valuable plants. A northern pine and spruce forest when destroyed by fire is succeeded by a growth of brambles, in time replaced by dwarf birch, poplar, and bird cherries, of no economic value; scrub oaks and various hard woods follow these, and pine rarely reappears except upon land long mellowed in the various operations of agriculture.

In the south Atlantic region a gradual change in the composition of the pine forests is steadily going on under the influence of fire. Less valuable species now occupy the ground once covered with forests of the long-leaved pine, through which annual fires have been allowed to run to improve the scanty pasturage they afford. Stockmen have been benefited at the expense of the permanency of the forest. Fire, too, changes the composition of the broad-leaved forests of the Atlantic region, although its influence is here less marked than upon forests of conifers, which, unlike deciduous trees, rarely grow from stump shoots, and must depend entirely upon the germination of seeds for their reproduction. Still, in regions continually burned over during a long period of time and then covered again with forests, as is the case in some portions of Kentucky and Tennessee, valuable species, like the white oak and the yellow poplar, are rare or entirely wanting in the new forest growth.

The forests of the north Pacific coast offer an exception to the law, otherwise general, for this continent at least, that a change of forest crop follows a forest fire. The fir forests of western Washington territory and Oregon when destroyed by fire are quickly replaced by a vigorous growth of the same species, and the fires which have consumed great bodies of the California redwood have not prevented the reproduction of this species by seeds and shoots. In the interior Pacific region forests destroyed by fire either do not reproduce themselves, or when, under exceptionally favorable climatic conditions, a growth of trees recovers the burned surface, poplars and scrub pines replace the more valuable species of the original forest.

The damage inflicted upon the permanency of the forests of the country by browsing animals is only surpassed by the injury which they receive from fire.

The custom of turning domestic animals into the forest to pick up a scanty and precarious living, common in all parts of the country, is universal in the southern and central portions of the Atlantic region and in California. Sheep, cattle, and horses devour immense quantities of seedling trees, the future forests of the country. They bark the trunks and destroy the vigor and often the life of larger trees. Hogs root up young pines and other plants to feed upon their succulent roots, and devour the edible fruit of many trees. In this way not only is the permanence of the forest endangered, but in the case of deciduous forests their composition is often seriously affected. Species with thin-shelled edible seeds, pines, white oaks, chestnuts, and beeches, are unable to hold their own against species with bitter or unpalatable fruit, on account of the excessive destruction of their seeds by hogs and other animals.

In the central portions of the Atlantic region the general replacement of the sweet-fruited valuable white oaks in the young forest growth by the less valuable bitter-fruited black oaks is noticeable, and seriously endangers the future value of the forests of this whole region. The damage inflicted upon the California mountain forests by sheep is immense; they threaten the complete extermination of these noble forests, and with them the entire agricultural resources of the state.

The pasturage of the forest is not only enormously expensive in the destruction of young plants and seeds, but this habit induces the burning over every year of great tracts of woodland, which would otherwise be permitted to grow up naturally, in order to hasten the early growth of spring herbage. Such fires, especially in the open pine forests of the south, do not necessarily consume the old trees. All undergrowth and seedlings are swept away, however, and not infrequently fires thus started destroy valuable bodies of timber. This is especially true, also, in the coniferous forests of the Pacific region.

The railroads of the country, using in the construction and maintenance of their permanent ways vast quantities of timber, inflict far greater injury upon the forests than is represented by the consumption of material. Railway ties, except in California, are almost invariably cut from vigorous young trees from 10 to 12 inches in diameter; that is, from trees which twenty or thirty years ago escaped destruction by fire or browsing animals, and which, if allowed to grow, would at the end of fifty or one hundred years longer afford immense quantities of valuable timber. The railroads of the United States, old and new, consume every year not far from 60,000,000 ties; the quantity of lumber in 60,000,000 ties is comparatively not very great, and would hardly be missed from our forests; but the destruction of 30,000,000 vigorous, healthy young trees, supposing that an average of two ties is cut from each tree, is a serious drain upon the forest wealth of the country and should cause grave apprehensions for the future, especially in view of the fact that in every part of the country there are now growing fewer seedling trees of species valuable for railway ties than when the trees now cut for this purpose first started.

The condition of the forests of Maine is interesting. They show that forest preservation is perfectly practicable, in the Atlantic region at least, when the importance of the forest to the community is paramount. The prosperity of this state, born of the broad forests of pine and spruce which once covered it almost uninterruptedly, was threatened by the prospective exhaustion of these forests, in danger of extermination by fire and the ill-regulated operations of the lumbermen. The very existence of the state depended upon the maintenance of the forest. The great forests of pine could not be restored, but the preservation of the few remnants of these forests was not impossible. Fires do not consume forests upon which a whole community is dependent for support, and methods for securing the continuance of such forests are soon found and readily put into execution. The forests of Maine, once considered practically exhausted, still yield largely and continuously, and the public sentiment which has made possible their protection is the one hopeful symptom in the whole country that a change of feeling in regard to forest property is gradually taking place. The experience of Maine shows that where climatic conditions are favorable to forest growth the remnants of the original forest can be preserved and new forests created as soon as the entire community finds forest preservation really essential to its material prosperity.

The production of lumber is not, however, the only function of forests; and the future extent and condition of those of the United States cannot, in every case, be safely regulated by the general law which governs the volume of other crops by the demand for them. Forests perform other and more important duties in protecting the surface of the ground and in regulating and maintaining the flow of rivers. In mountainous regions they are essential to prevent destructive torrents, and mountains cannot be stripped of their forest covering without entailing serious dangers upon the whole community. Such mountain forests exist in the United States. In northern Vermont and New Hampshire they guard the upper waters of the Connecticut and the Merrimac; in New York they insure the constant flow of the Hudson. Such forests still cover the upper slopes of the Alleghany mountains and diminish the danger of destructive floods in the valleys of the Susquehanna and the Ohio. Forests still cover the upper water-sheds of the Missouri and the Columbia, the Platte and the Rio Grande, and preserve the California valleys from burial under the *débris* of the sierras. The great mountain forests of the country still exist, often almost in their original condition. Their inaccessibility has preserved them; it cannot preserve them, however, much longer. Inroads have already been made into these forests; the ax, fire, and the destructive agency of browsing animals are now everywhere invading them. Their destruction does not mean a loss of material alone, which sooner or later can be replaced from other parts of the country; it means the ruin of great rivers for navigation and irrigation, the destruction of cities located along their banks, and the spoliation of broad areas of the richest agricultural land. These mountain forests once destroyed can only be renewed slowly and at enormous cost, and the dangers, actual and prospective, which threaten them now offer the only real cause for general alarm to be found in the present condition of the forests of the United States. Other forests may be swept away and the country will experience nothing more serious than a loss of material, which can be produced again if the price of lumber warrants the cultivation of trees as a commercial enterprise; but if the forests which control the flow of the great rivers of the country perish, the whole community will suffer widespread calamity which no precautions taken after the mischief has been done can avert or future expenditure prevent.